THE DELAWARE AND HUDSON COMPANY BULLETIN

JANUARY 1, 1927

1927

Make It Your Best Year

Life Is So Short

LET'S smile and be kind — life is so short,
And most of the way so rough,
The times are trying, the road upgrade,
And always trouble enough.
Yesterday's hurts we'll try to forego —
And tomorrow's cares can wait,
Today with diligence let us keep
Our hearts from the stain of hate.

Life is too short for spite and revenge,
And paying back wrong for wrong —
Try patience and love and forgiveness,
Meet slights with a smile and a song;
The sad world with all its repining,
Its bitterness, care and tears,
Needs the wealth of your loving kindness
To sweeten the sin-soiled years.

Yes, life is too short to be hateful,
Or scorning any you meet,
Then strive to be pleasant and gentle,
To always smile and be sweet;
For the sunshine of love is needed
To warm the world with its light,
And to shed abroad its effulgence
To bless humanity's night.

— MARGARET SCOTT HALL

"the D&H" The DELAWARE AND HUDSON COMPANY BULLETIN "the D&H"

Vol. 7 Albany, N. Y., January 1, 1927 No. 1

Grew Up With The A. & S.

Veteran Car Inspector Started With the Road as a Water-boy in 1862, and Remained Continuously in Its Service Until 1913

WE read the history of our Company and are enthused by it. The data concerning the organization of The Albany and Susquehanna Railroad Company and the building of its line from Albany to Binghamton is as interesting as any of the entries and particularly so to those who have been and still are employed on that portion of the road, which is now known as our Susquehanna division. The reason for this is exactly the same as that which makes all history interesting, and is to be found in the recital of events of which we have no other knowledge.

JOSEPH KIRCHNER

The Albany and Susquehanna Rail Road Company was incorporated on April 19, 1851, but not until September 16, 1863, was the first link in the route to Binghamton opened to public travel from Albany to Central Bridge. Few there are who can recall that notable event and fewer still who were then in the employ of the Company. To be one of those who have been in touch and conversant with all that has taken place in the years that may properly be recounted in the history of the Company, is a distinction to be envied.

Living at No. 109 Alexander Street, Albany, N. Y., is **JOSEPH KIRCHNER**, now in his eightieth year, who began work with the Company in 1862 and has been continuously on its pay-roll ever since, though from September 1, 1913, as a pensioner. To him, what others regard as the history of the Albany and Susquehanna railroad is a cherished memory. He began as a water boy under R. B. Patterson during construction days, when the end of the road was at Madison Avenue, Albany, where a station, or depot as people were wont to speak of such buildings then, was located.

Adept in the handling of tools and disposed to make himself generally useful he was not long in attracting Patterson's attention. These qualities stood him in good stead and won him promotion to the engine house, a small wooden affair, that stood at the foot of Green Street across from the present roundhouse, on the site of the old freight house close by the docks. Two locomotives, the *E. C. Delevan* and the *E. P. Prentice*, were all that the Company owned at that time; others arrived later on on river barges and each arrival was an event of considerable local importance.

Prior to beginning his railroad career he worked as a deck-hand on the *Baltic* and the *Anna*, river boats plying between Albany and New York in express service. He hired out to the Company for $30 a month and was " tickled to death to get that," he declares and, by way of explanation, tells us that " jobs were jobs " in those days.

Of the Erie War at the tunnel, north of Binghamton, he has a most vivid recollection. He was working as a car inspector at the Madison Avenue station, in Albany, when Jim Fisk and his Erie followers threatened to seize the road. Excitement was rife as preparations were made to repulse the invasion. A special train was made ready and while an " army " was being recruited from the Connaught block, between Madison Avenue and South Ferry street and extending from Broadway to the Hudson river, he was detailed to gather up all available sledge handles and similar articles that might be used as combat weapons. The crowd that eventually left the city was a daring, devil-may-care lot of fellows, who, wherever the train stopped, made it a part of their business to raid local saloons until, at last, precautions to thwart their marauding and to keep the party intact became necessary. Stations at which stops were planned were notified in advance and saloons closed before the arrival of the train.

For about forty years, all together, he was engaged as a car inspector, lastly, and for several years, at the Union station in Albany where his familiar face will long be remembered by crews that begin or complete their runs there. What a vast change has been wrought in rolling stock equipment during those forty years! To hear him tell of wooden brake beams, wooden brake heads, and wooden brake shoes is to feel as though you were listening to a visitor from a world entirely different from ours. The wooden brake heads were secured to the beams with wood screws six or seven inches long. The shoes, which were of hard wood and because they burned easily had to be renewed almost every trip, were nailed to the heads.

Initiative was the stock in trade of the successful workman of those days. Emergencies had to be met and solved on the spot. An example of just what this meant is to be found in his experiences with a hot journal on a gravel car while he was employed, for a short time, on a work train. The trouble developed in the vicinity of Knox but he managed to get the car into Albany by employing a no more elaborate cooling compound than that afforded by a pumpkin which he confiscated from a nearby field. He kept the journal box filled with pieces of the rind which provided the necessary deterrent to further heating.

The Rochester brake is another interesting early day contrivance. It was devised in an effort to do away with hand brakes and included a spring which had to be wound tightly by hand and could be released at the will of a member of the crew by means of a rope strung through the car, which, when pulled, would set in motion the necessary mechanism to permit the uncoiling of the spring.

He was born in Buffalo, N. Y., November 25, 1847, and was the only child of Henry Kirchner, a mason's helper. When he was ten years old, the family moved to Albany which city has since been his home. While still a young man he was married to Miss Sarah Debshire, who died twenty-three years ago, and to them two daughters and four sons were born. He is a member of The Delaware and Hudson Veterans' Association and of Holy Cross Roman Catholic church of Albany.

Christmas Club Saving

SIXTEEN years have elapsed since the first Christmas club was organized. The idea at once met with popular favor and has since developed into a tremendous, nation-wide savings movement with the Middle Atlantic, East North Central and New England States leading the country. During the year just ended 7,800,000 people saved approximately four hundred million dollars in this way and, just prior to the holidays, received their checks, the average amount of which was $51.32 per member.

Some interesting figures relative to the ultimate disposition of Christmas club funds have since been quoted by H. F. Rawell, president of the club. Something like $179,421,380 were expended in Christmas buying; $110,146,000 went into permanent savings or thrift accounts; $47,186,382 were used to pay insurance premiums and mortgage interest; $42,761,190 went for taxes and $18,752,648 for fixed charges maturing in the holiday season.

The phenomenality of the growth of the practice of depositing small sums throughout the year prior to a specified date of payment, is indicated by the fact that the number of banks participating has increased from one to 7,600; total annual deposits have jumped from $20,000 to $400,000,000; there are now 8,000,000 members as compared with 1,200 in the beginning; the average size of accounts has increased from $19.20 to $51.32, and the percentage of completed payments has improved from sixty-eight to ninety-two.

The Transportation Significance of the Steam Railroad

By PRESIDENT L. F. LOREE*

THE first transportation undertaken by man was a personal effort in which he packed his own burden. This method still persists in an organized way in parts of South Africa, where trains of porters form the only transportation agency. Under this method there may be transported daily 65 pounds 15 miles for each porter, or, allowing 312 days for a year's work, 152 ton miles. Passenger transportation was carried on in much the same way, the papoose being strapped to the back of the squaw or a lady seated in a chair lashed to two poles and carried on the shoulders of bearers.

With the domestication of wild beasts, pack trains were organized, utilizing the services of asses, horses, mules, llamas, camels, elephants, etc. These animals were used also for the transportation of persons, various forms of saddles being devised for comfort and security.

Even so late as 1750 almost the whole land-carriage of Scotland, and of several parts of England, was conveyed on the backs of pack-horses. A moderate-sized horse would weigh about 1,120 pounds. We may reckon his muscular exertion divided into seven parts, six of which are required to urge his own weight forward and one that of the load. A horse of average force, working for eight or ten hours per day, might transport on his back 200 pounds at the rate of 25 miles per day over an average level country. For a year of 312 days his performance then would be 780 ton miles.

Under Julius Caesar communication was made by paved roads between the capital of the Roman empire and the chief towns. These colossal works were not paths rudely prepared for the action of the feet of horses and the wheels of carriages by merely removing the natural asperities from the surface of the soil; they were constructed, on the contrary, on principles in some respects as sound and scientific as those which modern engineering has supplied—forests were felled, mountains excavated, hills leveled, valleys filled up, chasms and rivers spanned by bridges, and marshes drained, to an extent which would suffer little by comparison with the operations of our great roads of modern times. Then a man might have driven from the Moray Firth in Scotland, approximately 100 miles North of Edinburgh, over a paved road to Teman, in the Arabian Desert, about 180 miles South of Jerusalem. Following the fall of the empire, these roads were, for the most part, destroyed.

The condition of the main highways of England as described by travellers near the close of the eighteenth century was bad in the extreme. Transportation by wagon was not only intolerably slow but so expensive as to exclude every object except manufactured articles of light weight and small bulk in proportion to their value. The carter between Selkirk and Edinburgh, a distance of 38 miles, required a fortnight for his going and returning. This method of transportation for a year of 312 days enabled the transport of 1,976 ton miles for one horse. In the early eighteenth century, under the guidance of the engineers Macadam and Telford, highways were built with careful attention to grades and their surfaces properly metaled. Many cartage companies were formed for transport and an allowance of one ton of goods for a horse was very general. With this power 20 miles a day was covered, or, for a year of 312 days, 6,240 ton miles.

The introduction of railways as a substitute for common roads at Newcastle-on-Tyne took place between the years 1602-1649, probably a considerable time prior to the latter date. By 1750 there was scarcely an important mine but had its accompanying railway. The most of the railways descended in the direction the goods were to be conveyed, affording an easy draft to loaded carriages, and the descent was never so great but the empty carriages could be easily drawn up the acclivities. The only motive power for a long time after the introduction of railways was horses, and as long as the wooden rail continued in use, the general load for one horse was 4,704 pounds. When the wood-way was plated with iron, a horse was enabled to haul 5,936 pounds, exclusive of the weight of the wagons.

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* On Tuesday evening, November 23, at the Hotel Astor in New York, President L. F. LOREE was tendered the 1926 medal of The Holland Society of New York, which is annually awarded to the person who, in the estimation of the society, has done most to promote the welfare of mankind in his own particular field. On the occasion of the presentation, the recipient is expected to deliver an address upon the field of his experience and the text of this article is, in substance, the address made by PRESIDENT LOREE, who was the principal speaker of the evening.

The next improvement (about 1767) was the adoption of iron rails when the load of the horse was increased to nearly double the quantity theretofore taken upon the wooden rail (or to say 9,400 pounds), which also led to a complete change in the disposition of the road. This latter figure for a year of 312 days would give for each horse 29,328 ton miles.

The introduction of the steam locomotive occupied the period from Christmas Eve, 1801, when Richard Trevithick's first steam carriage was started along the highroad, with about seven or eight passengers, going off "like a bird," to October 6, 1829, when Stephenson's "Rocket" at Rainhill definitely established its supremacy.

Over this period of more than a quarter of a century competition was active between three quite different methods of transportation, with no particular advantage of one over the other. Freight continued to be hauled on railways in horse-drawn vehicles, and on the same rails in vehicles hauled by steam locomotives, both independent units, and to be dragged by rope haulage, the rope being coiled about a winding drum. At one time the directors of the Stockton & Darlington Railway, the first of the public carriers, seriously contemplated abandoning steam operation for operation by horses, both being at that time in vogue over the same rails, and when the Directors of the Liverpool and Manchester Railway faced a decision as to the method of operation their consulting engineers recommended rope haulage, and it was only the confidence and independence of George Stephenson, their engineer, that secured an appropriation of £500 to be offered as a prize for a trial of the steam locomotive, resulting in the final disposition of the whole controversy in its favor.

The "Rocket" was a four-wheeled engine not coupled, and weighed a little less than four and a half tons. Stephenson figured that from 10 to 12 pounds tractive effort would be required to move one ton on the Liverpool and Manchester Railway, so that, assuming that one-half of the total weight of the "Rocket" was on the two drivers and could be exerted as tractive force, this would give a haulage capacity of 102 gross tons.

There were on the payrolls of the railroads in the United States at the end of 1925, 1,753,208 employes. Making a rather arbitrary division of these employes between freight and passenger service on the basis of ton miles and passenger miles handled (using what is known as a traffic unit, three passenger miles equalling one ton mile), indicates that there were approximately 1,415,000 employes engaged in freight service. In the year 1925 the railroads transported 452,827,593,844 net tons one mile. Comparing the extremes only, we have 152 ton miles per year as the paying-load carrying capacity of the porter. The railroads, in 1925, transported 320,019 ton miles (paying load) per individual freight employe. That is, the productivity of the individual, due to the achievements of management, as reflected in the concerted movement and in the ordered discipline; the use of capital, reflected in the plant, the provision of power, and the multitudinous inventions and adaptations of machinery and tools; and his own intelligent industry, has been multiplied 2,105 times.

The world as we know it today is the development that has taken place in this last century and a half, and the difference between our command over nature and the facilities at our disposal today, as compared with those of our grandfathers' grandfathers' time, is doubtless greater than the difference between their generation and the nomadic tribe of Abraham and Lot.

It is interesting to reflect that, notwithstanding man's age-long acquaintance with the atmosphere, it was not until about the time of Columbus that he recognized that the air had weight; and that, notwithstanding his age-long acquaintance with steam through the boiling pot, in which for the most part his meals were prepared, he found no means of utilizing the force of steam until James Watt gave it practicality by the invention of his double-acting steam engine in 1782, and its application to a rotary motion in 1784.

The extent of the change is not more impressive than the shortness of the time. Recently The Champlain Transportation Company, a subsidiary of The Delaware and Hudson Company, celebrated its one-hundredth anniversary. The Lake Champlain Steamboat Company, a predecesor corporation, put a steamboat on Lake Champlain in 1809, and it and The Champlain Transportation Company have been operating boats continuously on that lake since that time. Perhaps the most impressive incident of the centenary celebration was the presence of Captain Ell B. Rockwell, ninety-six years old and still active in the Company's service as captain of the steamboat "Vermont." It is vividly suggestive of the brevity of our present mode of living that the lives of Captain Rockwell and another of the Company's boat

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How The Crane Grew Up

Interesting Bits of History Associated With the Evolution of the Crane, from Pyramid Days Down to the Present, Are Here Related

Text and Illustrations by Courtesy of the Industrial Works, Bay City, Mich.

(Continued from Last Issue.)

FIFTEEN hundred years after the beginning of the Christian era there lived in Italy a great genius, Leonardo da Vinci. His accomplishments were many, for he was equally eminent as an artist, an architect and an engineer. His sketch-book has been preserved to this day and it contains his working sketches of lever hoists, blocks and tackle, and derricks in a profusion of applications. If he could have taken one more step, three hundred years in advance of his time, and invented the steam engine, this genius might have built the first steam locomotive crane. As it was, he sketched a workable design of an airplane, but without power.

The lever hoist is a very old type of hoisting device. During the middle ages in Europe it was quite generally used for lifting heavy loads short distances. One form consisted of a lever with two pins as variable fulcrums, one of which was moved up by hand at each stroke of the lever. In another form, the fulcrum was made of pawls and ratchets which were automatically engaged by a spring. Our modern automobile jacks are much like this form of lever hoist, as are similar modern contrivances.

To overcome the limited lifting range of the lever hoist, the drum and crank were developed. In this evolution the variable fulcrum became a shaft held in rigid bearings and the short end of the lever became the radius of a drum, so that the load could be lifted continuously and for a much greater distance. The long end of the lever was a crank, rotating continuously in one direction.

The treadmill, another form of drum and crank, has been used in Europe for several centuries. Doubtless there are some still being used, as in the olden days, chiefly in the work of unloading boats and raising coal from mines. Loads were lifted by men walking forward in the treadmill, and lowered by walking backward. This was a dangerous practice in contrast with the modern safety requirements of industries in the United States.

A set of gears was next developed to increase the power of the drum and crank, and following this was the addition of a boom so that a load could be lifted at some distance from the winch. The third improvement was to place the winch, with its boom, on a post so that it could be made to rotate. Thus was born the pillar crane, dating back to some time in the eighteenth century, the exact date being unknown.

The development of the pillar crane did not stop here, however, because the post was soon mounted on wheels to increase the usefulness of the device. This resulted in a crude form of locomotive crane, the direct ancestor of the modern machine. Probably the first locomotive crane operated by hand power was built by Henry Maudsley in England, in 1811.

The remarkable development in cranes really began with Watt's invention of the steam engine

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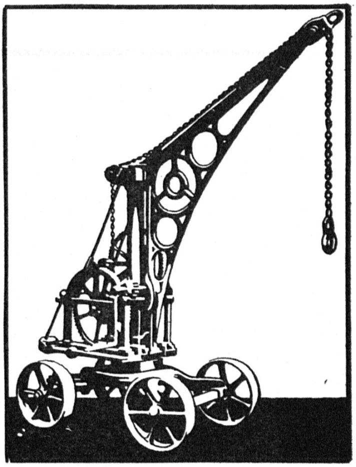

The Maudsley Crane, 1811

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In Business "On His Own"

A YOUNG man working in a railroad office in Minneapolis some years ago determined to go into business for himself.

He had saved a little money and he began a still hunt for a business he could buy and run and be his own boss.

He knew the railroad business but he did not know all about it. Nor did he find any railroads he could buy with a few hundred dollars down and the rest in installments.

There was a cigar store he might have bought but he didn't know anything about cigars. There was a confectionery store and a shoe shine stand and a restaurant of the short order variety and a motion picture theater, one of which he might have been able to swing.

But he knew enough to realize that he did not know anything about these things and that he would lose most of his money while he was learning.

"I wish I knew somebody who would give me some advice without charging me too much for it," he said one day to a companion on the quick lunch stool beside him.

"You can get plenty of cheap advice, but it isn't worth anything," his friend said. "Pick out the most conservative man you know and follow him."

Then he remembered that his father's banker was an old friend of the family and he went to him.

"I want to go into business for myself," he said, "and I come to you for advice because I know you are a friend of mine. I am willing to pay for it."

"That is part of a bank's service to its depositors," the other said. "You don't have to pay for advice at your own bank. What business do you know best?"

"The railroad business, but I can't very well buy a railroad. The capitalists have bought them all up."

"Any objection to going into a partnership agreement?"

"Not if it's all right."

"Well, if you will pick out the railroad you like, I'll buy you a piece of it and you will be in the railroad business just as much as if you owned the whole thing."

"How's that?"

"Bonds. A first mortgage bond is better than buying the railroad, because you can sell it at full value whenever you like."

"But I won't have any hand in running the railroad."

"You'll have a hand in running that little department of it that you're in charge of, won't you? That is a great deal."

"Then you think that road I am working for is a good buy?"

It happened that at the time the banker did.

And so the boy put the better part of a thousand dollars into railroad bonds.

"When you get enough of those bonds and have learned more about the railroad business you can trade them for voting stock and you'll be running your own business besides owning it," the adviser said as the boy left.

"And I have always considered that I went into business for myself right then and there and have been ever since," the young man said the other day in the Athletic club.

He is not so young as he was and he has always drawn a salary from a railroad but he owns enough railroad stocks to be quite a factor in the railroad business even without his good position.

Have you tried going into your own line of business "on your own" that way?—From the *Minneapolis (Minn.) Star.*

Generally speaking, we have leisure without precedent, and are less in need of knowledge of what to do in our hours of labor than of knowledge and habit of how to use our leisure wholesomely.—TOM FINTY, JR., Staff Correspondent, "*Dallas News.*"

Tidal Energy and Its Utilization

Man's Hope That He May Harness the Inexhaustible Energy of the Tide For Commercial Purposes, May Not Soon Be Realized

IN his interesting book on "The Tide," H. A. Marmer discusses tidal energy and its utilization. He says the various schemes that have been suggested for the utilization of tidal energy divide into four classes or systems:

1. The float system: This is a very simple one. A floating body of considerable weight is lifted by the rising tide, and on the falling tide this body is made to work by means of an appropriate system of levers and gears. It is not difficult to compute the power that is theoretically available through a system of this kind. Suppose we have a hulk weighing 1,000 tons floating in a tidal waterway having a tide range of 20 feet. On its fall this hulk will be capable of doing work represented by 2.000 x 1,000 x 20=40,000,000 foot-pounds. This work is accomplished in a tidal cycle of 12½ hours. Hence the horse power is represented by 40,000,000 divided by 12.5 x 60 x 33,000=1.62. Altogether apart, therefore, from the mechanical difficulties of transmitting the slow motion of the falling hulk, the insignificant amount of horse power realized by this scheme proves it to be of no practical value.

2. The tidal-stream system: Where use is made of one or more paddle wheels fixed on a raft anchored in the tidal waterway. As the tidal current ebbs and flows, the moving water causes the wheels to rotate. Without going into details of calculation it may be said that while this system is more efficient than the float system, it is applicable only to very small power units.

3. The compressed air system: Makes use of the energy of the tide in the direct compression of air in closed chambers of suitable design. Calculation shows that while this system gives better results than the float or tidal-stream systems, it still gives but a minimum of power output and, considering the cost involved, is far too small to make the system at all practical.

4. The basis system: The last of the four systems is the only one that presents the possibility of the practical utilization of the energy of the tides in that it permits of large-scale installations. In principle it is simple, consisting essentially of one or more basins cut off from the sea by dams. As the tide rises and falls, suitable gates in the dams permit the maintenance of differences of levels of water between basin and sea, or between one basin and another during part of the tidal cycle. These differences in level produce the necessary heads of water for the production of power through turbines and auxiliary machinery. * * * The tidal power available, therefore, depends on two factors, namely, the area of the basin enclosed and the range of the tide. In regions where the tide has a range of 10 feet, every square mile of tidal water impounded is theoretically capable of producing 7,200 horse power, while with a tidal range of 20 feet the horse power available is 28,800. These figures represent the *maximum* horse power *theoretically* available. Actually only a fraction of this power can be obtained. For example, a considerable portion of the time of each tidal change would be unavailable since there would not be sufficient head to actuate the turbines. Further, the slip of 50 minutes each day gives the power an essentially intermittent character. It may be taken that where the average range of the tide is less than 10 feet, the development of tidal power is not economically feasible. On the other hand there are no more than 15 places in the world where the tidal range exceeds 20 feet and pretty much all of them are situated near the Arctic regions or in localities remote from centers of civilization.

At present it is not at all certain that, as an independent unit to supply power for ordinary industrial purposes, any large-scale tidal power development would be financially successful. The facts do not lend color to the pleasant prophesies, at times heard, that in the not far future mankind will derive the power demanded by a civilized world from the inexhaustible energy of the tide.

At Fort Hamilton, on the eastern shore of the Narrows, the entrance from the ocean to New York Harbor, an automatic tide gauge has been in operation for over a quarter of a century. The average rise and fall of the tide—that is, the range between mean high and mean low water —has been found to be 4.7 feet. At times of the new and full moon the rise and fall of the tide is increased by 20 per cent, while at the times of the moon's first and third quarters the range of the tide is increased by 20 per cent. Furthermore, when the moon is in perigee—that is, when she is nearest the earth—the tide is 20 per cent greater than the average, while when the moon is in apogee—that is, when she is farthest from the earth—there is a decrease of 20 per cent from the average. So when the moon is both full or new and in perigee the rise and fall of the tide at Fort Hamilton is about 40 per cent greater than the average.

Because of its enormous mass, the sun's tide-producing power should be more than 26 million times as great as that of the moon, if they were both at the same distance from the earth, but the moon is 389 times nearer than the sun, and because of its nearness overcomes the advantage of the sun's greater mass; so that the moon's force to produce tides is something like 2¼ times as great as that of the sun, and hence the tide follows the moon. In consequence of the moon's period of revolution being 24 hours 50 minutes, the tides tend to become later each day by 50 minutes, while the duration of the rise and of the fall are equal, each being about 6 hours 12 minutes.

The ocean tide sweeps into New York Harbor past Sandy Hook. Fourteen miles from Sandy Hook the Hudson River receives the impulse of the tide and carries it up along its course for a distance of 131 geographic miles, where it is stopped by the state dam at Troy. As we go upstream the tide gradually becomes later, but with this distinctive feature, the times of high water and low water do not become retarded by the same amounts. At Tarrytown, 24 nautical miles up the Hudson, high water is 1 hour 50 minutes later than at the mouth, but for low water the difference is 20 hours 00 minutes; at Storm King, 45 miles from the mouth, high water is 3 hours 30 minutes later and low water 3 hours 50 minutes later; and at Albany, 125 miles from the mouth, high water and low water are later by 9 hours 30 minutes and 10 hours 30 minutes respectively. High water travels faster than low water, and this is characteristic of river tides. During the spring freshets in March and April, the tide becomes completely obliterated at Albany and even for some distance below. At the mouth of the Hudson the average range of tide is 4.4 feet, while at Troy, the head of tide water, the range is 3.0 feet. The velocity of the tidal current in the Hudson is two knots or more. The knot or nautical or geographic mile is 6,080 feet, while the statute mile has a length of 5,280 feet.

Elect C. A. Morgan, President

DURING the year to come, C. A. **MORGAN,** superintendent of the Pennsylvania division, will serve as president of The Delaware and Hudson Railroad Club which has its membership among the supervisory officers on the division. His nomination, made at the regular quarterly meeting which was held in the Trinity parish house, Carbondale, on the evening of November 2, last, was accorded the unanimous approval of the members. Other officers elected at the same time were as follows: M. F. CLUNE, trainmaster, vice-president; D. J. BUCKLEY, division accountant, secretary; J. J. BRENNAN, master mechanic, treasurer; F. W. LEWIS, chief clerk to the superintendent, financial secretary; M. J. MCDONOUGH, division engineer, J. W. HOWARD, divisional car foreman, and H. L. SYMONS, road foreman of engines, members of the executive committee.

The attendance at the meeting was most encouraging and the interest accorded the transaction of business matters and the talks that followed was appreciative. The speakers were MR. SYMONS and MR. HOWARD, the former taking for his subject, 'Economical Operation of Locomotives," and the latter, "Maintenance and Operation of Freight Train Cars by the Car Department." A buffet luncheon was served following adjournment of the business session.

Toot-Toot

SOME twenty years ago the *Boston Globe* published a complaint made to a railroad company relative to the racket made by its switch engines. The item was of such a humorous nature that it was clipped and has since been preserved by P. J. KIRKWOOD, conductor in the Oneonta-Saratoga-Whitehall pool, who, thinking others might find it of interest, has sent it to *The Bulletin* for publication. It follows:

"Gentlemen: Why is it that your switch engine has to ding and dong and fizz and spit and bang and hiss and pant and grate and grind and puff and bump and chug and hoot and toot and whistle and wheeze and jar and jerk and howl and snarl and puff and growl and thump and boom and clash and jolt and screech and snort and snarl and slam and throb and roar and rattle and yell and smoke and smell and shriek like hell all night long?"

I told my boss the other morning that I'd been up all night with a baby—he asked me what her name was. —*Sample Case.*

The Transportation Significance of the Steam Railroad

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commanders, Captain Jahaziel Sherman, overlapping by at least two years of associated activity in the operation of boats on the lake, comprehend the rise of the United States from colonial dependence to independence and primacy among the nations; the whole history of steam railroad and of steamboat transportation; and as well the application of steam power to rotary motion; in short, the entire period of our industrial civilization, with its outstanding contribution to progress in the arts that house and clothe and feed, and hence establish the material foundation for moral advancement.

If we then consider the locomotive of today, it still is what it was when Zerah Colburn described it in the middle of the last century—a combination of three distinct arrangements. The source of power lies in the boiler and firebox; the cylinders, valves, pistons and the connections are the means by which this power is applied to produce motion within the machine; and the wheels, by means of their adhesion to the rails, enable the exertion of the tractive force, securing the locomotion of the machinery which impels them, and from their surplus power above what is necessary to move the locomotive alone, to haul also the great load behind it upon the rails.

Production of Steam: Liquid water, not under pressure, may be raised from melting to boiling point with no more than 180 units of heat, which is called "sensible heat," because it is reflected by the rise of the mercury column in the Fahrenheit thermometer. But this water cannot be made to burst into steam until 970 more additional heat units have been added. This is called "latent heat of evaporation." It requires comparatively little additional heat to raise the temperature of steam under pressure. Thus, it takes 1,150 heat units to raise water into steam at no pressure. To raise the steam to a pressure of 350 pounds requires only the use of 56.6 additional heat units, so that the economy in producing additional power by increasing the pressure of the steam is very great.

When water is burst into steam it expands to 1,700 times its original volume. It is this high expansive force and the inverted ratio of its pressure to the space it occupies that is utilized in the locomotive engine. In working steam expansively the extent of the application depends mainly on the density and pressure of the steam drawn from the boiler.

The heat that raises the temperature of the water in the boiler and finally explodes it into the vapor of steam acts in three ways:

The transformation of the molecular energy of a hot body into the wave motion of the surrounding ether and the propagation of these ether waves through space is termed heat radiation, and, in a locomotive boiler, is from 20 to 25 per cent greater in efficiency than is the heat-transfer efficiency when convection only is available.

The other two methods—convection and conduction—are less economical and yet it is by convection that in the present locomotive boiler by far the greatest proportion of the heat is imparted.

The steam generated from heated water varies in quality, owing to deterioration caused by "priming" or water carried over into the cylinders with the steam. The boiler, with a very small steam space at its top, has the water level close to the "throttle" or outlet valve, and water from the back-lash or surge after swashing against the firebox tube sheet is picked up by the escaping steam. The delivery from the boiler to the cylinder of dry steam, the temperature of which has been raised, is the function of the superheater, which, while generally spoken of as a part of the boiler, has no relation to it other than location.

The use of superheated steam has done more to improve the performance of the steam locomotive than any change that has been made in recent years.

In applying the heat to the water, the water itself being contained in the boiler of the locomotive, the earlier locomotives had a single tube through which the flames passed from the firebox to the smokestack, where they were discharged into the atmosphere; later a return tube was applied, but the whole matter took a standard form in the construction of the "Rocket" with its 25 small tubes running parallel through the boiler. The "Rocket" also had water legs, with sheets three inches apart, down the sides of the firebox. Subsequently, the crown sheet was added below the sheet covering the top of the firebox and water introduced into this receptacle. The latest development, as represented by the "Horatio Allen" of The Delaware and Hudson Company, following modern stationary and marine engine practice, does away with the water legs and the water over the crown sheet and substitutes therefor self-supporting cylindrical containers. The firebox itself thus contains almost 1,200 square feet of heating surface as compared with from 300 to 450 square feet in the largest combined fireboxes and combustion chambers of the conventional locomotive boilers, so that in the production of steam 75 per cent instead of 40 per cent is generated by radiation at the firebox end of the boiler, where it can be most effectively and economically generated.

The fire used in the boiler is a combination of combustible fuel, such as coal, with the oxygen in the atmosphere, and the latter is supplied by means of a draft, created by allowing the steam discharges from the cylinders to escape into the chimney. This draws the air through the flues and into the firebox, between the grate bars upon which the fire rests, and with the air passes the products of combustion. Manifestly, this draft must in the main be artificially produced; otherwise there would be none when the engine was standing and but little when in motion.

Motion Work: The application of the expansive power of the steam to produce motion within the machine is accomplished by what is usually spoken of as "the motion work," or "valve gear," consisting of the cylinders, valves, pistons, and connections. It is interesting to note that Watts in his double-acting engine introduced the steam into the cylinder and provided for its exhaust therefrom through poppet valves. These not working well, his superintendent, William Murdock, a highly ingenious Scotch mechanic, developed first a piston valve and later a slide valve to accomplish this purpose. Slide valves were almost universally used until about 1890, when the piston valve was further developed and very much absorbed the field. Recently, applications have been made of an improved poppet valve, with suitable valve gear, with considerable prospect of its coming into general use. It is interesting that we should thus return over the abandoned road.

Adhesion: The ability of the locomotive to move under the application of the force of steam is due to the adhesion of its wheels to the rails. The area of contact is dependent upon the load and upon the contours of the top of the head of the rail and of the tires of the driving-wheels, whether flat or curved or more or less worn. Due to the balancing of the reciprocating and revolving parts the dynamic pressure at average speeds will exceed the static pressure by about 10 per cent. As the resistances to be overcome are greatest in starting the train, it is adhesion under static pressure that is of prime importance. Giving consideration to all the variables, it is evident a fair average only of contact area can be stated, which will probably not be far from one square inch for each 100,000 pounds of weight on the eight driving-wheels; for a large modern consolidation locomotive of 250,000 pounds weight on the drivers, say, two and one-half square inches, or for each wheel about one-third of a square inch, a space about as large as one's thumb-nail.

The adhesion of the smooth surfaces of the wheels and rails in these very small areas is dependent upon weight alone. The adhesion is diminished by the effect of the torque, due to the alternate working of the two cylinders; to the reciprocating motion imparted by the piston movement; to irregular handling of reverse gear and throttle by the engineman, and by the condition of the rail. Experience has shown that about one-quarter of the weight on the drivers can be relied upon as resistance to the "tractive force."

While dependence upon adhesion is now familiar to all, it presented at the beginning one of the most formidable obstacles, so much so that one of the earlier railways built in 1811 by Blenkinsop used a rack rail fixed in the center of the railway. The experiments of Hedley in 1813 and of Stephenson in 1814 resolved these doubts and they no longer cloud the mind.

Of the three competing elements of transportation, the horse as a power unit has been definitely minimized, but the contest between the independent self-contained unit and the rope haulage system is still actively waged. On July 27, 1884, electricity was applied in the movement of street cars at Cleveland, Ohio, and came rapidly into use. This is, in essence, a rope haulage system. There is the great central power station; the dynamo, standing for the winding drum; and the trolley wire providing the circuit for the electric current, attaching to which the vehicle is drawn along. This system was so superior that it drove the individual unit system—the horse-drawn car—out of service and completely supplanted it in city and suburban transit.

About 1898, with the application of the internal combustion engine to road vehicles, there began the development of the automobile. In its turn this individual transportation unit, whether used as a pleasure car or as a motor bus, has rapidly driven the suburban trolley lines and the city lines of meager traffic out of service, they being no longer able to preserve their financial solvency. There is the further possibility that even tomorrow a cheap, durable and fool-proof electric storage battery may be invented, enabling the use of its power by an independent unit in transportation, completing the discomfiture of the rope haulage traction system.

The substitution of electric haulage for steam railway transportation is widely urged. While this contest may be expected to continue long in the future, perhaps usurping and stabilizing itself in restricted fields, the dominance in its larger aspect will depend largely upon the ability, genius, courage and tenacity of the exponents of one or the other method of transportation. For myself, I have an abiding faith that for the main purposes of the railroad—the transportation over long distances of heavy articles—the unit system of transportation will be the dominant one.

I have spoken thus at length about the locomotive because it is, as Mr. A. G. Pack, Chief Inspector of the Interstate Commerce Commission, has described it, "the heart and soul of transportation." Nevertheless it is a part, and a part only, of a huge assemblage. The vehicles in which freight and passengers are carried have undergone an analogous development. We began to move freight in the chaldron, with a carrying capacity of something over two and one-half tons; by 1860 we had developed a five-ton car, with four wheels, the axles fixed in the frame. The Civil War compelled an increase in the carrying capacity and we advanced to ten tons and eight wheels; with the wonderful increase in railroad mileage in the early 1870's the capacity was increased in 1873 to fifteen tons; in 1876 the twenty-ton car was introduced; in 1883 the twenty-five ton; in 1885 the thirty-ton; in 1895 the forty-ton; in 1900 the fifty-ton; and in 1915 the seventy-ton, of which we now have in use more than 121,000. Meanwhile the paying load has increased more than 50 per cent with reference to the weight of the vehicle.

The advantages gained have been enormous; friction and atmospheric resistance have been reduced; the number of vehicles required has been lessened, saving capital investment, upkeep and empty haul; increases in shops, yards and main tracks have been avoided and switching reduced, while train movement has been lessened, and the wage bill shrunk. These changes in the power and vehicles are paralleled in the structure of the track and its appurtenances, the stations, depots and waterside facilities.

Quite as characteristic has been the development of the working force. In the railroad service, the men, besides the physical requirements, are held to a high state of discipline. In the main, they are subject to be called upon for duty at all hours of the day and upon all days of the year. They are under control, not only as to the disposition of their time, but as to some of their personal habits. They are engaged in a hazardous occupation.

The effect of discipline and drill is to mold, to make the whole mass, as it were, an instrument, which, at the will of one may exert its force in a certain direction and to a certain end.

As to the management, it is character and power of will that enables one, as a leader, to control masses of men. He must subject all alike, himself included, to that discipline which is a bond stronger than iron; more impervious than adamant. He must have not only courage and endurance, but also that indefatigable quality called "pluck," and, as well, instinct, that incomprehensible something which takes the bird to its nest in the vast sameness of the prairie, or the bee to its home in the hollow tree hidden in the labyrinth of the forest.

The railroad rests its hope of successful operation very largely upon organization, discipline, and continuity of employment. It must have a continuous policy, a history personal in its character, and an *esprit de corps* founded on mutual experience, respect and confidence. Here, as in other fields, the whole is not merely the sum of all the parts, but that sum plus the interaction of the parts; regulating, inhibiting, stimulating, multiplying their effectiveness and force.

This is not the place to enlarge upon the service of steam railways to mankind. It is enough to suggest that they were the indispensable condition of the abolition of slavery and equally the means by which famines have been abolished. They made of a primitive agriculture a world commerce; they broadened in every way the comfort and security of life. They have made the civilized lands the mother countries of the world.

The wealth of the country, more evenly divided here than in any other part of the world, was not sufficient before the war for a higher standard of living than then obtained. The one hopeful way for the future is through the increase in production.

If the rewards of the future are to be increased, the most important task, incumbent upon employers and employes alike, is to increase the national product. If we fail, the first signs of failure may be looked for in the system of transport, the break-down of which has involved in destruction those nations which have perished in the past, and is the explanation of their passing.

Happily our system of steam railroad transportation gives no sign of internal weakness. Quite the contrary, perhaps never has it been in a position to face, with greater courage or determination, the duties of the future.

How the Crane Grew Up

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toward the end of the eighteenth century. Following this invention came Stephenson's locomotive and Fulton's steamboat early in the nineteenth century, coincident with experiments in the application of steam to locomotive cranes.

It was in England that the first steam locomotive cranes were built. From available records it is not exactly clear as to just who built the first of these, or where it was built, but the *Engineer* of London for May 28, 1909, sheds some light on this question. The first of a number of stationary steam derricks was built by James Taylor of Birkenhead, in 1839. These had single-cylinder vertical engines with fly wheels, which he found dangerous. Accordingly, in 1853, he took out a patent for a steam winch, including the application of link reversing motion, with double cylinders and no fly wheel.

The designing and building of the first steam locomotive crane was carried on between the years of 1852 and 1858. It appears that the design was made by W. W. Hulse, and the crane built by Taylor.

There is definite record, also, of a steam locomotive crane built by Taylor in 1859 or 1860, and supplied by Hulse. The drawing in the *Engineer* shows that it is of wonderfully good design for an early crane. It is full revolving with a variable radius boom, vertical engines, a short locomotive-type boiler, and the whole mounted on a neat four-wheel railway car.

Independently, and at about the same time, the Appleby Brothers of London, built their first steam cranes, but their first one came out a few months later than Taylor's crane. C. J. Appleby felt the need of something of the kind when erecting bridges in Russia in 1851, but it was in 1861 when they brought out the first crane. It was a rather crude machine, as may have been seen from illustrations. They developed and improved this crane and their product was soon used all over the world. Their hand cranes were exhibited at the International Exposition in London in 1851, and their steam cranes at Paris in 1867, and Vienna in 1873. They issued a catalog in 1869. It is recognized, therefore, that America is indebted to England for the first locomotive crane. Appleby Brothers' cranes were used and exhibited at the Philadelphia Centennial in 1876, where they gave rise to much favorable comment on account of their excellence and remarkable capacities as labor savers.

In 1883, C. I. Appleby visited this country and addressed a meeting of the American Society of Civil Engineers on "Cranes as Labor Saving Machines." He brought out points concerning their flexibility of application that are still true today of the modern locomotive crane.

English builders, however, were not to be permitted to enjoy a market in America for long. Yankee engineers entered the field and today the United States leads in the crane industry. In this all-important work, the Industrial Works of Bay City, Mich., has led for fifty years. The company was established in 1873, three years previous to the Philadelphia Centennial Exposition, for the purpose of producing special equipment for mill, marine and railroad use. Fifty-three long years of experience have been marked by achievement and victory in the specialized task of doing but one thing, that of making cranes and their accessories.

At the Philadelphia Centennial in 1876, there were no steam locomotive cranes built in America shown, the few machines then in use having been imported from England. There was a number of old-time steam shovels in use, however, in the construction of the many lines of railroad that have since been combined to form a network over our country. Only cranes of wide gauge that could not be readily transported were first built, and in 1880 the first standard gauge railroad steam shovel was built. The only wrecking crane in the country was in use on a Michigan railroad and had been built in its shops.

In the first wrecker, the crane was located at one end over double four-wheel trucks and was of peculiar construction to allow for raising and lowering it readily. Manila ropes were used as compared with the steel cables of today. The boiler and machinery were mounted stationary on the other end of the car and enclosed in a wooden cab. Slewing the load through a small arc was accomplished by a rack device on the boom. A number of these were built during the first ten years of the firm's existence and were the forerunners of the larger cranes, since manufactured, and the giant 200-ton crane of today.

A 15-ton revolving steam railway crane was built in 1886 by the Industrial Works, in which the crane proper was mounted at one end of the car and the boiler at the opposite end. It is a mark of success that some of these cranes built in the early eighties are still in use.

Sigmund Romberg, the composer, tells of meeting a circus sword-swallower. He asked him to demonstrate his art, and the fellow apparently swallowed some pins and needles.

"But," protested Mr. Romberg, "those aren't swords; they're pins and needles."

"I know it,' replied the circus freak, "but I am on a diet."—*New York Evening World.*

Clicks from the Rails

Dependable

"PEOPLE wont to ride buses and overlook the dependability of railroads, altered their habits and were glad to return to their old love. In the many floods which swept different parts of the state most of the trains were on time and the passengers were given the uniformly good service which is taken for granted on railroads. It is refreshing occasionally to have a flood or some other act of nature come along to jar folks into a realization of their dependence upon train service. People expect railroads to maintain full service at all times and howl lustily if any curtailment is made by the railway as a means of compensating for the falling off of traffic. They will submit to any kind of discomfort in traveling in a bus without even whimpering, but let a train run a few minutes late, run out of ice water or be a little dusty and complaints will immediately be raised."—*El Reno (Okla.) American.*

* * *

Schoolrooms Aboard Trains

In northern Ontario, it is reported, a novel arrangement has been made for providing school facilities to children living in the sparsely settled sections. The Province has a compulsory school law and in many sections a sufficient number of children may not be gotten together to warrant the maintenance of a regularly established school. Accordingly, in order to meet the emergency, two railroad coaches have been fitted up as school rooms and attached to a regular train. The children are taken on at the stops en route, instructed by a teacher during the day and taken back to their homes on the return trip, the course of study having been especially adapted to the train schedule.

* * *

Canadian Vets to Banquet

The annual banquet of the Canadian Railways Veterans' Guild, which compares with Veteran organizations of railroad employes in the States, is announced for February 5, next, at the Windsor hotel, Montreal. Invitations are being sent to the Prime Minister, the Minister of Railways, and prominent citizens.

Make Study of the Whistle

Even such a seeming trifle as the locomotive whistle is receiving the attention of men of strived-for goal of efficiency. Actually the locomotive whistle is not such an unimportant consideration, because at least $8,000,000 is spent annually by the American railroads on this accessory.

Dr. A. L. Foley, professor of physics at the University of Indiana, has made extensive investigations which serve to throw considerable light upon this subject. His figures show that the locomotive whistle uses four tons of water and 1,200 pounds of coal for every continuous hour of operation.

To reduce the amount of steam required and to make the whistle more effective, Dr. Foley suggests that it be placed in a parabolic reflector on the front of the engine near the headlight. This would prevent the deflection of the sound by the smokestack and other equipment. Another change which he suggests is the abolition of the musical chimes whistle in which several notes are sounded at once. In its stead he would substitute a whistle at a much higher pitch. This would result in a saving of steam and in a higher frequency of vibration to which the human ear is more sensitive.—*LaSalle Trade and Transportation Bulletin.*

* * *

Largest Searchlight in the World

Makers of the largest searchlight in the world assert that under its rays a newspaper may be read at a distance of forty miles. It is of two billion candlepower and its intensity is said to be as great as all the lights combined in New York's "white way." The giant is so perfectly balanced on its truck that "a child could direct it," its makers say.

* * *

In twenty separate weeks in 1925, beginning about the middle of July, loading of revenue freight by the railroads of the country, exceeded one million cars, while the total for the year was 51,177,962.

* * *

Advance crop estimates for 1926, according to the Car Service Division of the American Railway Association, indicate that the transportation problem this fall will be greater than heretofore.

Novel Transportation

"Sheer novelty of transportation," reads an ASSOCIATED PRESS dispatch of recent date, "is the claim to fame of the Pupmobile railroad between Nome and Shelton, Alaska, for the trains are minus both locomotives and engineers.

"The motive power is furnished by husky dogs and the railroad crew is composed of the passengers themselves. Operation of the trains consists solely in wielding a whip, except in cases where two trains meet between sidings. In that contingency, the one with the lighter load is lifted from the track while the other passes. Then the 'engine' is hitched on again and the journey continues.

"The railroad has eighty-seven miles of narrow gauge track. It was built in the early days of Alaska mining to connect the Kougarok mining district with the coast and was bought by the Territory three years ago. It is now operated by the Alaska road commission for public use."

* * *

Period of Expansion Nearby

"The country is now closely approaching a time when the railroads must expand along new and important lines to keep abreast of the steadily enlarging exchange of commodities. Public understanding of the manner in which the roads won their present measure of prosperity will mean much to the future of both the carriers and the country. Fair treatment of the roads, with due regard to the public interest, is now more than ever necessary. To go bebond this and grant them liberal treatment would undoubtedly be the greatest single investment the country could make to insure future prosperity."—*Philadelphia (Pa.) Record.*

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First Train-Airplane Crash

What is believed to be the first collision between a speeding train and an airplane occurred at Bromberg, Poland, recently. A test airplane, belonging to the military aviation school, incurred a motor defect and was forced to land on the railroad tracks. Just as the plane was alighting, a Cracow-Danzig express appeared and crashed into it. No casualties resulted.—*Railway Age.*

JANUARY

SPARKLING world and shining sky,
Sleigh-bells jingling, jangling by,
Skates that gleam and sleds that fly,
Make up January.

Snowy world and low hung cloud,
Snowflakes whirling in a crowd,
Winds a-whistling long and loud,
Make up January.

Snow and shine and shine and snow,
Days that swiftly come and go,
Thirty-one of them, you know,
Make up January.

— *Author Unknown.*